nomenon. As described then, in December, the drooping twigs (on all but one of the main branches) curl up until each twig reaches a position above its point of origin, and the tree has a round-topped, bristly appearance. The writer will be much indebted to any one contributing observations, photographs, etc., of a willow tree showing similar changes; dates of the observed changes are also desirable.

JEAN BROADHURST

A NEW FORM OF PYROLA BRACTEATA.—*P. bracteata* Hook. var. **Hillii.** var. nov. Stem and flowers as in the species; leaves wanting. Dry woods, Mayne Island, British Columbia.

Mr. Albert J. Hill, M.A., who collected the plant several years ago, says it is not rare in the above locality. It is quite distinct from *P. aphylla* Smith by its long bracts; and from *P. aphylla var. paucifolia* Howell by its calyx lobes, which are half as long as the petals.

J. K. HENRY

VANCOUVER

CURRENT LITERATURE AND NOTES

HOWARD, C. *Les Zoocécidies des Plantes d' Europe et du Bassin de la Méditerranée.* Tome III, Supplement 1909–1912; pp. 1249–1560. 1567 figures, 3 plates and 8 portraits. Librairie Scientifique, A. Herrmann et Fils: Paris. 10 Fr. This most excellent work, the third and supplementary volume of which has just appeared, is a model for a similar work on our American cecidia. This third volume contains brief, clear descriptions of 1,317 species of galls distributed among 149 genera of gall makers and in 92 families of host plants. The species are grouped with reference to the taxonomic order of the host plants on which they occur but zoological and botanical indices makes the work very valuable for both entomologist and botanist. A very unique system of abbreviation on the margins of the pages indicate the location of the gall on the host plant and its geographical distribution. The illustrations are mostly line drawings but are of such character as to greatly facilitate the deter-

minations of the species. One of the most interesting parts of the work is the treatment of 16 galls on cryptogams. The work closes with a bibliography of 204 titles.

This line of work which has received so much attention in Europe has been greatly neglected in America, but with the increasing interest in evolution, biochemistry, physiology and plant pathology the time is not far distant when it must become one of our most interesting and productive lines of botanical research. It is a field in which our American botanists must soon follow the lead of their European colleagues. However, it is unfortunate that in both Europe and America, the myco-cecidia have received much less attention than the zoö-cecidia.

MEL T. COOK

HAWKINS, L. A. *The influence of calcium, magnesium and potassium nitrates upon the toxicity of certain heavy metals toward fungus spores.* Physiological Researches 2: 57–92, 1913. Mr. Hawkins has shown that, in certain cases, the effect of a toxic salt on the germination of the conidia of *Glomerella cingulata* may be influenced by the addition to the medium of calcium, magnesium or potassium nitrate. For the combination of $Cu(NO_3)_2$ with $Ca(NO_3)_2$ and of $Zn(NO_3)_2$ with $Ca(NO_3)_2$ and $Mg(NO_3)_2$, he has shown that this effect is not due to the formation of undissociated double salts. He has also shown that it is not due to the depression of the ionization of the toxic salt. The salts which he tested, given in the order of their toxicity, are as follows: $Cu(NO_3)_2$, $CuSO_4$, $Pb(NO_3)_2$, $Al(NO_3)_3$, HNO_3, $Zn(NO_3)_2$, $Ni(NO_3)_2$, $Mg(NO_3)_2$, $Ca(NO_3)_2$, and KNO_3.

L. O. KUNKEL

HANS KNIEP, *Beitrage zur Kenntnis der Hymenomyceten I, II.* Zeitschrift für Botanik, 5: 594–637. Au 1913, reports another effort to discover the origin of the binucleated cells in the hymenomycetes. The work, as the title indicates, is divided into two parts. The first is devoted to a study of a new species, *Hypochnus terrestris* Kniep. The author traces the development of this form from spore to spore and shows that there are no sexual organs or their equivalents. The spore prior to germina-

tion becomes binucleated. The germ tube and subsequent cells are all binucleated. The nuclei divide conjugately. He holds that these forms of fungi are reduced types rather than primitive ones.

The second part is devoted to a cytological study of the life cycle of *Coprinus nychtemerus* Fr. He studied the germination of spores of this species and found that the cells of the germ tube are uninucleated, binucleated and more rarely multinucleated. He also reports the presence of clamp connections in which he discovered peculiar structures resembling nuclei. As to what the significance of these bodies is Kniep is not clear. He argues that the clamp connections serve no other purpose than to facilitate the transportation of food stuffs. Mycelial cells in later stages are uninucleated and binucleated. He holds however that the binucleated condition does not become fixed until the formation of the carpophore. The nuclear phenomena in the basidium are similar to those reported by other observers. He finds eight chromosones in the first division. Kniep was unable to find secondary nuclei in the basidium.

MICHAEL LEVINE

MOLISCH, H., *Ueber den Einfluss des Tabakrauches auf der Pflanze.* Sitzb. Wien Akad. Mat. Nat. Kl. 120 Abt. 1: 3–30, 813–838, + *2 pls.* 1911, takes up the question of the effect of tobacco smoke on plants grown under greenhouse conditions. Seedlings of *Vicia sativa*, *Pisum*, *Cucurbita Pepo*, etc., were grown in water cultures, covered by a bell jar of 4 L. capacity and 1–3 puffs of cigar or cigarette smoke passed under the jars. Excellent photographs illustrate the striking results. Growth in length is practically stopped in the plants subjected to smoke; they commonly show a greater stem-diameter, however, than the controls. If the seedlings are grown in porous flower pots the results are similar for about the first three days, then the smoked plants begin to grow rapidly—a result attributed to the absorption of the injurious substances by the soil and pot.

Similar effects were obtained with the smoke of paper, wood, straw. Using singly various of the constituents present in tobacco smoke, it was found that nicotine is quite without effect,

carbon monoxide leads to results similar to those obtained with tobacco smoke, etc. Molisch considers the data inadequate, however, for determining what constitutes the effective ingredient or ingredients of tobacco smoke.

Older plants generally are much less affected by tobacco smoke than seedlings. A number of specific peculiarities are encountered, however. In *Goldfussia glomerata* lenticel formation is induced; *Syringia vulgaris*, *Rosa*, etc., shed their leaves (spring time) after about two days' exposure to tobacco smoke.

W. G. M.

Plant Breeding in Scandinavia. By L. H. Newmann. Published by the Canadian Seed Grower's Association, Canada Building, Ottawa, Canada. Price $1.00 net (cloth $1.50). The plant breeding station of The Swedish Seed Association at Svalöf is now generally recognized as one of the foremost stations in the world for the practical and scientific breeding of the cereals.

Mr. Newmann has recently spent about nine months at Svalöf where he studied the methods of work and examined the various printed and private records of the investigations. This personal experience enables him to perform a distinct service in presenting the work of the station in book form to English reading students.

The main divisions of the volume are as follows: I, Introduction; II, The Swedish Seed Association (general résumé); III, The System of plant improvement at Svalöf and its development; IV, The composition of a race of cereals and its variability; V, Practical application of principles now recognized in cereal breeding at Svalöf; VI, Methods of work in cereal breeding at Svalöf; VII, Summary of work done with different crops and results obtained (wheat, barley, pease, clovers, grasses, and potatoes); VIII, Appendix; IX, Literature cited.

A brief synopsis of the points that are of special interest can be grouped under the following heads:

Methods and Results

The method of "*mass selection*" is still used in maintaining purity of sorts, and as preliminary to "line culture" and hybridization.

Pedigree culture or *line breeding* on a large scale is a main method. In pure lines there are no *hereditary variations*, and "no correlations between botanical characters and industrial qualities." Value of pure lines determined only by the yielding tests. This sort of line breeding isolates superior biotypes.

Artificial hybridization.—An important method in scientific breeding. Importance at Svalöf considered as based on the Mendelian conception of alternative inheritance and the recombination of unit characters. It is followed by careful line breeding of hybrid progeny.

Variability

No *progressive* mutations in cereals have appeared at the Svalöf station.

Variations in cereals are largely due to natural hybridization. Aberrant forms in grains are often cases of segregation in the progeny of heterozygotes.

Acclimatization is due to regrouping of factors in a heterozygous population. The stronger combinations survive.

Hereditary variations may be continuous where different combinations of different units are such that gradations in a given character result. Continuous hereditary variations are possible but are considered as based on the chance combination of independent units (or fractions of a unit) which ultimately form a multiple factor.

In regard to the practical and theoretical study of variations, the work with potatoes at Svalöf is proving of special significance as the potato is propagated vegetatively in what is essentially a pure line. In the five years that potato breeding has been in progress "continuous selection of desirable hills and tubers" has resulted in improvement.

In criticism it may be noted that this sort of continuous hereditary variation is not to be explained on the basis mentioned above and suggests that a Mendelian conception of continuous hereditary variations is of doubtful validity. In fact much of the data presented concerning variation not only in the vegetative reproduction of potatoes but in the sexually reproduced cereals

suggests that the interpretation in terms of unit factors may be a rather gross analysis.

A. B. S.

Two works have just appeared of interest to taxonomists and some other botanists. The last supplement of *Index Kewensis* brings this indispensable work down to the end of 1910, and includes citations to thousands of species and near species described during the four years that have elapsed since the previous supplement. There are more than two thousand species of *Hieracium* cited, and as to *Crataegus* and other prolific genera an equally astonishing number of new names are listed. A new departure is the failure to italicize what the authors of the work consider untenable names, in the present volume, although they have indicated their preferences in this regard.

A supplement has also been issued by Dr. Carl Christensen, of the *Index Filicum*.

N. T.

NEWS ITEMS

We quote in part, from the following letter of Dr. E. D. Merrill in regard to the death of Dr. C. B. Robinson, noted in TORREYA for January: "Dr. Robinson was murdered on December 5, 1913, about 8 miles from the town of Amboina by six Mohammedan natives of the island of Boeton. The island of Amboina is entirely pacific, and there has been absolutely nothing to fear from the inhabitants of that island. Dr. Robinson's voluminous progress reports make no mention whatever of any difficulties with the natives, and the idea that harm might result has never been entertained by ourselves in Manila, by Dr. Robinson himself, or by the Dutch officials in Amboina. The coincidence of these six Mohammedans coming from the distant island of Boeton, their meeting with Dr. Robinson on one of his botanical excursions, and his resulting murder were matters that could not be foreseen and could not be guarded against. . . . The results